

DECLARATION UNDER 37 C.F.R. § 1.131

Serial Number: 09/210,055

Filing Date: December 11, 1998

Title: METHOD AND APPARATUS FOR CONTROLLING IMAGE TRANSPARENCY

Dkt: 884.055US1

**S/N 09/210,055****PATENT****IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant:	John D. Miller	Examiner:	Thu T. Havan
Serial No.:	09/210,055	Group Art Unit:	2672
Filed:	December 11, 1998	Docket:	884.055US1
Title:	METHOD AND APPARATUS FOR CONTROLLING IMAGE TRANSPARENCY		

**DECLARATION UNDER 37 C.F.R. § 1.131**

Commissioner for Patents  
Washington, D.C. 20231

This declaration is submitted under 37 C.F.R. § 1.131, prior to any final rejection, with respect to U.S. Patent Application Serial Number 09/210,055 (the "Application") to establish conception and reduction to practice of the subject matter of the rejected claims prior to the effective date of the cited art (i.e., U.S. Patent 6,329,988, issued to Watanabe et al.), upon which the rejection is based.

I, John D. Miller, do hereby declare:

1. On December 11, 1998, the filing date of the Application, I was an employee of Intel Corporation, the assignee of the Application.
2. I am the sole inventor of the subject matter of all claims of the Application.
3. Prior to the filing date, I conceived the invention in the United States as evidenced by a copy of a signed invention disclosure form attached hereto as Exhibit I.
4. The invention disclosure of Exhibit I was prepared by me at least as early as March 23, 1998.

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5. The invention disclosure of Exhibit I was signed by my Supervisor at that time, Marc Millier, on March 23, 1998.

6. I diligently worked to constructively reduce the inventive subject matter to practice as evidenced by the filing of the Application for the claimed embodiments of the invention. I worked with a patent attorney as my other duties permitted in preparing the Application for filing with the United States Patent and Trademark Office. On information and belief, I received at least one draft of the Application for review and revision on or about October 30, 1998.

7. Material redacted from Exhibit I is not related to dating the conception or reduction to practice of the inventive subject matter.

8. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

Date:

12 July 2004  
John D. Miller

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Respectfully submitted,  
JOHN D. MILLER

By His Representatives,

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(612) 349-9592

Date

Aug. 5, 2004

By

Ann M. McCrackin

Ann M. McCrackin

Reg. No. 42,858

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 5 day of

Aug. 2004. 8/5/04  
August KML

P.O. Box 1450, Alexandria, VA 22313-1450  
8/5/04 KML

KACIA M. LEEKacia M. Lee

Name

Signature

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## APPENDIX I

**REDACTED INVENTION DISCLOSURE FORM**

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INTEL INVENTION DISCLOSUREINTEL CONFIDENTIAL

IAL/ACA

DATE: 23 March, 1998

MAR 23 1998

It is important to provide accurate and detailed information on this form. The information will be used to evaluate your invention for possible filing as a patent application. When completed, please return this form to the Legal Department at JF3-147. If you have any questions, please call 264-0444 or 264-0998.

- ✓ 1. Inventor: Miller, John David  
SS#: 541-86-7532 WWID: 10180220 Phone: 503 264-8929 M/S: JF3-375  
Home Address: 18590 SW Sumac St, Beaverton OR, 97007  
Citizenship: USA BUM Presenter: Craig Kinnie  
Group: Division Name: IAL Subdivision: ACA  
Supervisor: Marc Millier WWID: 10067979 Phone: 503 264-8770 M/S: JF3-375
2. Title of Invention: A method and apparatus for controlling object transparency as a function of its angle of incidence with the camera.
3. What technology/product/process (code name) does it relate to: 3D Information Visualization
4. Stage of development
5. (a) Has a description of your invention been, or will it shortly be, published outside Intel:  
NO: X YES: DATE WAS OR WILL BE PUBLISHED:  
If YES, was the manuscript submitted for pre-publication approval? YES: NO:
- (b) Has your invention been used/sold or planned to be used/sold by Intel or others?  
NO: X YES: DATE WAS OR WILL BE SOLD:
- (c) Does this invention relate to technology that is or will be covered by a SIG (special interest group)/standard/ or specification?  
NO: X YES: Name of SIG/Standard/Specification:
- (d) If the invention is a semiconductor device, actual or anticipated date of tapeout? n/a
- (e) If the invention is software, actual or anticipated date of any beta tests. none set
6. Was the invention conceived or constructed in collaboration with anyone other than an Intel blue badge employee or in performance of a project involving entities other than Intel, e.g. government, other companies, universities or consortia?  
NO: X YES: Name of individual or entity:

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MAR 25 1998

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Please attach a page to this form, DATED AND SIGNED BY AT LEAST ONE PERSON WHO IS NOT A NAMED INVENTOR, to provide a description of the invention, and include the following information:

1. Describe in detail how the invention works.

The invention unclutters 3D graphics scenes by making objects more transparent when they are not being looked at directly.

In this invention, transparency increases (i.e., the "alpha" component is reduced) as the angle between the object and the screen (aka "camera") decreases from head-on. That is, when an object is viewed straight-on, it is completely opaque. If the object is being viewed off-angle, then the object is proportionately more transparent, unobscuring whatever objects might be behind it.

Mechanically, the invention computes an alpha factor [0..1] based on an object's angle of incidence to the camera and the selected mode, where mode is one of FRONT\_ONLY (e.g., opaque only when the front is perpendicular to the camera) or BOTH\_SIDES (e.g. opaque when either the front or back is perpendicular to the camera).

Notes:

- The invention is completely independent of 3D graphics engine (e.g., Direct3D, OpenGL, etc.).
- The invention can be triggered every time the scene changes or the camera moves or even every redraw, as appropriate. How and when this is done is outside the scope of this invention.
- An application may trigger then invention just once per complex object or once for every polygon, as appropriate. This is usage dependent and is outside the scope of the invention.
- An application may use the output of this invention directly or modulate it for the desired effect. For example, an application may not want the object to become completely transparent or completely opaque. Or, the application may want the object to be most opaque at an angle of incidence other than 90 degrees. Or, the application may prefer a non-linear scaling between most transparent and most opaque. All of these are interpretations of the invention's results and should be obvious to those "skilled in the art."

2. Describe advantage(s) of your invention over what is done now.

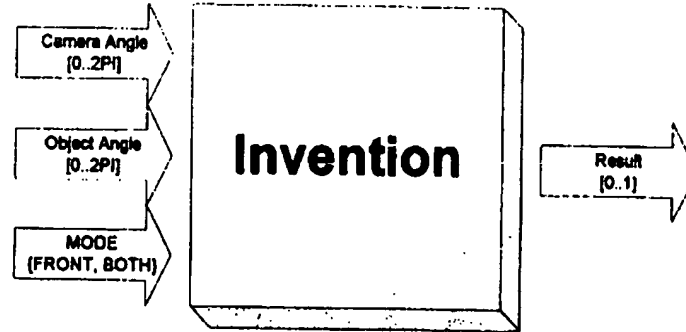
Scene clutter and object obscuration is a big problem in 3D graphics. The invention "thins" the scene by making off-angle images less opaque, allowing whatever is behind them to show through.

These techniques are especially useful in 3D visualization applications, where understanding is much more important than visual "reality."

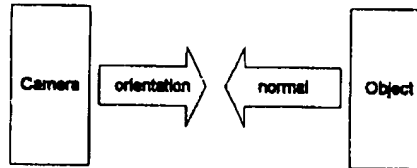
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3. Include at least one figure illustrating the invention. If the invention relates to software, include a flowchart or pseudo-code representation of the algorithm.

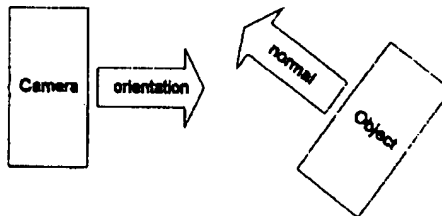
This figure shows a functional block diagram of the invention as a "black box" that computes alpha based on three input parameters:



The following two examples show how alpha reduces as the angle between the camera orientation and object "normal" vector (the vector perpendicular to a polygon face) increases.



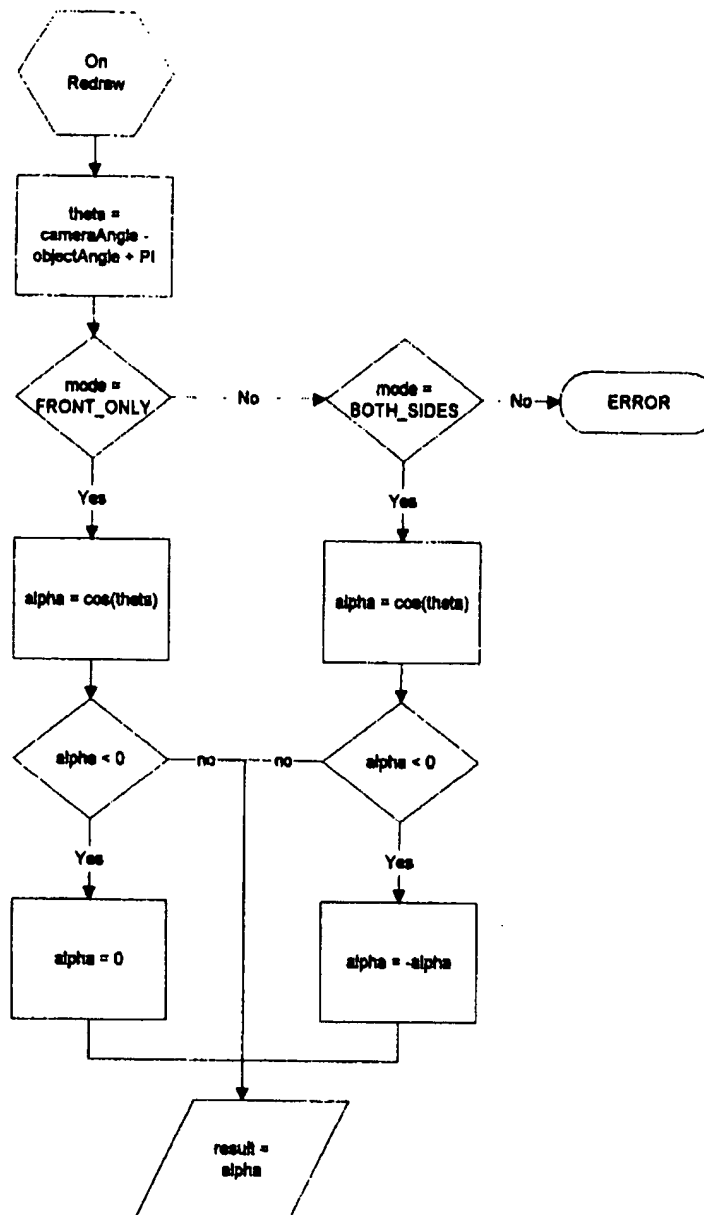
Example #1: Maximum Alpha



Example #2: Alpha reduced by approximately 50%

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Here is the flowchart of the invention machinery:



4. Value of your invention to Intel (how will it be used?).

The invention will be employed in our various 3D application prototypes.

Current 3D graphics engines calculate angle of incidence between objects and light sources to smoothly shade the surface. This makes intuitive sense: the more directly the light strikes the face of the polygon, the greater the effect of the light on the resulting brightness of the object (i.e., its shade).



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This invention is a novel twist on this idea, using the angle of incidence between the object and the camera to modulate the object's opacity. Unlike traditional 3D graphics lighting, the effect is decidedly *not* modeled on nature, although it bears some conceptual resemblance to a polarizing filter.

6. Who is likely to want to use this invention

Three-D graphics is still a nascent technology, but as 3D graphics become more mainstream, IP in 3D graphics technology will become increasingly valuable to our patent portfolio.

\*HAVE YOUR SUPERVISOR READ, DATE AND SIGN COMPLETED FORM

DATE: 3/22/98

SUPERVISOR:



BY THIS SIGNING, I (SUPERVISOR) ACKNOWLEDGE THAT I HAVE READ AND UNDERSTAND THIS DISCLOSURE, AND RECOMMEND THAT THE HONORARIUM BE PAID